

The

HEMIST

August, 1961



PROF. JAMES W. PERRY (left) accepts The Certificate of Honorary AIC Membership from Dr. W. George Parks, Chairman of the Committee on Honorary Membership.

(See Page 297)

Volume XXXVIII

Number 8



New Finger-Fitted Handle



Safe...easy-to-use...
comfortable

J.T. Baker's
"Shure-Grip"
5-pt. bottle for
**'BAKER ANALYZED'
REAGENT ACIDS'**
(acetic, hydrochloric, nitric and sulfuric)
and Ammonium Hydroxide

PICK UP J. T. BAKER'S "Shure-Grip" bottle. Feel your fingers lock naturally into the safe, comfortable position. Your index finger grips the exclusive contoured handle opening with firm no-slip control...3-way support provides extra security when lifting and pouring. Dripless pouring sleeve helps achieve maximum safety. Six 5-pint "Thro-A-Way" bottles packed in each compact, protective "Thro-A-Way" case saves you time, space and money. No deposits, no returns, no empties to store.

FAST EFFICIENT DELIVERY from more than 90 'points of service.'
Call your LSR (Laboratory Supply Representative).

J. T. Baker Chemical Co.
Phillipsburg, New Jersey



PROOF OF PURITY

Regardless of the container, all 'Baker Analyzed' Reagent Acids and Ammonium Hydroxide continue to give you the highest standards of purity in the industry, defined to the decimal by the **Actual Lot Analysis** and **Actual Lot Assay**. Color-matching labels and closures guard against accidental contamination in your laboratory.

*acetic, formic, hydrochloric, nitric, perchloric, phosphoric, phosphorous, sulfuric and sulfurous acids in reagent and other listed grades

The CHEMIST

Reg. U. S. Pat. Off.

Publication of

THE AMERICAN INSTITUTE OF CHEMISTS, INC.

60 East 42nd street, New York 17, N. Y.

Entered as second class matter April 8, 1936 at the Post Office at New York, N. Y., under Act of August 24, 1912. Second class postage paid at New York, N. Y. Issued monthly.

Subscription price, \$3.00 a year to Members, \$4.00 to Non-Members. Single copy, this issue, \$0.35. Copyright, 1961, by THE AMERICAN INSTITUTE OF CHEMISTS, INC.

Vol. XXXVIII

August, 1961

Number 8

THE AMERICAN INSTITUTE OF CHEMISTS Council

Officers and Directors:

President, Dr. Johan Bjorksten
President-elect, Dr. C. Harold Fisher
Secretary, John Kotrady
Treasurer, Dr. F. A. Hessel
Chairman of the Board, Dr. Milton Harris

Councilors-at-Large and Directors:

Dr. R. P. Dinsmore Dr. S. D. Kirkpatrick
Dr. W. E. Hanford Dr. John H. Nair
Dr. Henry B. Hass Dr. L. H. Reyerson
Dr. D. B. Keyes Dr. W. J. Sparks
Martin B. Williams

Councilors:

Dr. E. M. Burdick, *Florida Chapter*
Dr. G. M. Cunningham, *Western Chapter*
Dr. J. W. Eldridge, *Virginia Chapter*
Henry E. Hancock, *Midwest Chapter*
Dan L. Henry, *Piedmont Chapter*
Dr. John L. Hickson, *New York Chapter*
Dr. Charles A. Horton, *Tennessee Chapter*
Dr. E. M. Kipp, *Philadelphia Chapter*
Dr. Wayne E. Kuhn, *Past President*
H. A. Levey, *Louisiana Chapter*
Lyle J. Mahar, *Niagara Chapter*
Dr. John F. Mahoney, *New Jersey Chapter*
Dr. Clem O. Miller, *Washington Chapter*
Dr. J. L. Rendall, *Twain City Chapter*
Dr. George F. Rugar, *Ohio Chapter*
Bernard E. Schaar, *Chicago Chapter*
Dr. Robert D. Schwartz, *Southwest Chapter*
G. H. Taft, *New England Chapter*
Dr. Walter W. Thomas, *Delaware Chapter*
Clark E. Thorp, *Beaver Falls Chapter*
Emerson Venable, *Pittsburgh Chapter*
Dr. Robert W. Walker, *Alabama Chapter*
Dr. A. H. Warth, *Baltimore Chapter*

THE CHEMIST

Editor, V. F. Kimball

Advisory Board:

Dr. Joseph F. Abere
William Q. Hull
D. H. Killeffer
Dr. Sidney D. Kirkpatrick
Dr. Wayne E. Kuhn
James W. Perry
Bernard E. Schaar
P. J. Wood
Dr. A. C. Zettlemoyer

Contributing Editors:

M. R. Bhagwat
D. H. Killeffer
Dr. Frederick G. Sawyer
Donald Slavin
Florence E. Wall
Martin B. Williams

Department Editors:

Dr. Ed. F. Degering, *Condensates*
Doris Eager, *Opportunities*
Richard L. Moore, *Public Relations*
Dr. Rudolph Seiden,
 Chemical Books Abroad
Dr. Kurt Konigsbacher,
 Life with Chemistry

• • •
Deadlines for THE CHEMIST: For the September issue the deadline is August 15.
• • •

THE AMERICAN INSTITUTE OF CHEMISTS does not necessarily endorse any of the facts or opinions advanced in articles which appear in THE CHEMIST.

IN THIS ISSUE

Our Committees: What They Do, Dr. Johan Bjorksten, F.A.I.C.	279-288
Special AIC Announcements	289
Twin City Chapter Officers	
Social Hour in Chicago	
To All Chapter Secretaries	
Philadelphia Chapter Elects Officers	
To New Chapter Officers	
Report from the Committee on Legislation	290
The Impact of Federal Scientific Research Programs on Technological Progress, The Hon. Richard S. Morse	291
Scientific Information—Future Prospects, James W. Perry, Hon. AIC	297
Perry Honored at Information Retrieval Conference	302
Friends Departed	304-306
Dr. Harry Linn Fisher	Dr. Maximilian P. Hofmann
Joseph Harrison Brennan	Joseph A. Kohm
Carl Busow	Arthur Linz
Jerry H. Geller	Dr. Franz M. Neumeier
Dr. Ivor Griffith	Brig. Gen. Harry P. Newton
Karl M. Herstein	Dr. Robert E. Swain
	Dr. William D. Turner
New AIC Members	307
Communications:	
Additional Reference Suggested	309
On Incentives	309
Reply to the Letter Above	310
Wanted: Gasoline Storage Bags	310
Before and After E = Me ²	310
Opportunities	310
The Salaries of Chemists in Australia, 1960	311
Chemical Books Abroad	312

To Come in September

Our long-time secretary, Dr. Lloyd Van Doren, accepted Honorary AIC Membership, this Spring, with a paper on "Chemical Patent Procedure," which tells the inventor, step by step, how to go about patenting his invention . . . Gerald Gordon, M.D., chief psychiatrist at E. I. Du Pont de Nemours & Co., presented an unusual paper before the Chicago Chapter, recently, entitled, "How to Live With Your Job." . . . And there will be a number of short articles on a variety of things.

Advertisers Render a Service to You

J. T. Baker	The Lento Press	310
Chemical Co. <i>Inside Front Cover</i>	Arthur D. Little, Inc.	312
Bios Laboratories	Phoenix Chemical Laboratories	295
Bjorksten Research Laboratories	Robinette Research Laboratories	303
Johns-Manville <i>Inside Back Cover</i>	Foster D. Snell, Inc.	311
LaWall & Harrisson	Truesdail Laboratories	296
U. S. Stoneware <i>Outside Back Cover</i>		

Our Committees: What They Do

Dr. Johan Bjorksten, F.A.I.C.

AIC President

(President Bjorksten, on his way to Europe by ship this June, studied the Annual Reports of the AIC Committees, which were presented at our 38th Annual Meeting. From Sweden, he sent us a summary of the main activities of these Committees, and the personnel of the new Committees, for the information of the AIC membership. The addresses of Committee chairmen are given so that AIC members may direct inquiries or comments to them.)

THE AMERICAN INSTITUTE OF CHEMISTS, operating through appointed Committees, has been active in many areas to further or to clarify the interests of professional chemists. The following is a summary of the activities of the Committees during the past year, and some of their programs for the coming year.

The Committee on Chapter Activities

During the fiscal year 1960-61, this Committee had as members:

Dr. L. T. Eby, *chairman*,
Dr. Walter S. Guthmann
Dr. Lloyd A. Hall
Bernard E. Schaar

During the present 1961-62 fiscal year, the Committee has the following personnel:

Dr. Henry L. Weisbecker, *chairman*;
2138 Berkeley Ave., St. Paul 5,
Minn.
Dr. Charles E. Feazel
Dr. Bernard S. Friedman
Dr. Walter S. Guthmann
Dr. Lloyd A. Hall
Bernard E. Schaar
Clark E. Thorp

As new Chapters were formed, this Committee has given assistance in organizing programs and committees and has supplied initial advice to help them to function. Local Chapter Committees have been organized by the Chapters in such fields as study

of education, employer-employee relationships, salary studies, public relations, legislature and awards.

"Meeting programs common to active and successful chapters have included:

- (1) Honor Scroll Dinner: often the largest event in numbers and interest.
- (2) Presidential address. The national president tries to visit as many chapters as possible.
- (3) Education: A meeting planned for the benefit of students and teachers in colleges or high schools.
- (4) Plant trip (if in an industrial area).

"Other subjects of interest are:

- (5) Unionism in chemistry (by a professor of labor relations or someone properly qualified to speak on a non-partial basis).
- (6) Human side of the chemist (by a psychologist or one skilled in human relations).
- (7) Employer-Employee Relations (best handled by a panel).
- (8) Salary Survey Discussions.
- (9) Chemistry and Law.
- (10) The Planning of a Technical Center (vitally concerned with the environment of the chemist).
- (11) The Chemist and Public Health (dealing with FDA).
- (12) The Chemist and Small Business.
- (13) The Effect of Mergers on Chemists.
- (14) How a Chemist Secures a Position.
- (15) Locating and Employing European Scientists.
- (16) The Chemical Profession in Foreign (specify) Countries.
- (17) Management Development of Technical Men.
- (18) The Chemist and Cost Accounting."

—From Report to 38th Annual Meeting

The Committee intends to continue maintaining liaison between Chapters and to help the newer Chapters receive the benefit of experience obtained elsewhere, so that any particularly successful program devised by one Chapter is relayed to the others.

The Chapter Activities Committee will also stress the public relations oriented activities. These are probably the most important and most neglected means for promoting the profession. Activities, such as awards, can be especially created to give public relations value, but unless an equal amount of effort is placed in this direction, the potential value will not be realized. The newspapers are avid for local news; it is not necessary to have a professional public relations man to be effective, but it does take one who can write tersely and who is willing to spend some time to see his efforts materialize.

The Committee on Clinical Chemistry

This Committee during the preceding year consisted of:

Dr. Kurt M. Dubowski, *chairman*,
University of Oklahoma, School of
Medicine, Oklahoma City 4, Okla.

Dr. Alfred H. Free

Dr. Warren M. Sperry

and it will continue with the same members for the current year.

"Among accomplishments of the past year may be counted our part in certain prior meetings and negotiations with the American Medical Association Committee to Study the Relationships of Medicine with Allied Health Professions and Services, dur-

ing which certain forceful recommendations were made to that group by the chairman with respect to the role of clinical chemists and particularly to a stand to be adopted by the AMA regarding possible future legislation dealing with medical services requiring direct supervision of qualified physicians. Our presentation took strong exception to the original inclusion by the AMA Committee of a provision that any such future statutes relating to services involving the prevention of nervous, mental or physical illness should require such services to be performed under the direct supervision of qualified physicians. I am pleased to report that the AMA Committee upon further consideration agreed with this stand and that pursuant to its recommendations, the AMA House of Delegates, on June 16, 1960, adopted a final report of that Committee which no longer contains any reference to organized medical profession demands that services involving the prevention of illness or disorders be performed under the direct supervision of physicians. At this time, there is in the process of development by the AMA a mechanism for continuing liaison and possibly other activities with biomedical professions and services as recommended by this Committee and the AMA Committee, to that organization.

"It is hoped that the AIC through this Committee can continue to be informed of the interests and activities of the new Committee on Relationships of Medicine with Allied Health Professions and Services of the AMA under the chairmanship of Dr. Raymond M. McKeown.

"Your Committee, at the request of AIC officers, has considered a number of problems arising in the practice of clinical chemistry by certain members of the AIC and other chemists. The major instances of difficulty appear to have arisen from two sources:

"(1) Attempted or actual engagement in non-chemical private commercial clinical laboratory work by persons primarily or exclusively qualified as chemists;

OUR COMMITTEES . . .

"(2) Attempted curtailment of the legal and factual rights of qualified independent clinical chemists to practice clinical chemistry independent of direct medical control and supervision, including financial control.

"Your Committee conducted numerous contacts including some with various official state agencies, and is pleased to be able to report that it has found no instance of official interference with the legal right of qualified clinical chemists to engage in the independent professional practice of clinical chemistry. The Committee did, however, recommend to the AIC that in the interests of safeguarding our ultimate influence and potential success the AIC decline to be drawn into the position of claiming as the practice of clinical chemistry those operations, procedures, and work properly and commonly accepted as being outside of the scope of clinical chemistry, and further decline to support the claimed right of chemists to engage independently or otherwise in such non-chemical work.

"Certain attempts to interfere with the independent professional practice of clinical chemistry by qualified chemists, especially in the State of Florida, have been brought to the attention of this Committee and its advice sought. No formal action has been requested or recommended by the Committee in these instances at this time, but the Committee is maintaining closest liaison with the individuals concerned and with other interested groups.

"Finally, it is a pleasure to report that the Committee continues to enjoy the closest contact with and cooperation of the Committee on Clinical Chemistry of the American Chemical Society, and that it has been, by invitation, represented at each policy meeting of the ACS group during the past two years and has again received such invitations for joint discussions and exchange of information and views during the current year."

—From Report to 38th Annual Meeting

These activities will be continued, with close attention to any legislative or other activities which might tend

to restrict the scope or position of chemists as professionals in the clinical field. Particularly gratifying has been the greatly improved liaison with the American Medical Association, which has been established and will be maintained. The AIC working through this Committee, expects to side with the AMA in any legislative proposal involving restriction of the use of animals for medical study.

The Committee on Legislation

The previous Committee on Legislation consisted of:

Dr. Wayne E. Kuhn, *chairman*
Stephen P. Cobb, Jr.
Dr. John L. Hickson
Dr. Donald B. Keyes
Dr. Max Tishler

The current Committee consists of:

Stephen P. Cobb, Jr., *chairman*, 151
Prospect Ave., Tarrytown, N. Y.
Dr. Ed. J. Durham
Dr. D. B. Keyes
Dr. J. Frederic Walker

This Committee has been alert to the introduction of regulations that adversely affect the profession of the chemist and the chemical engineer. Several bills are now in the making, some of which may have undesirable effects.

In the State of New York an unnoticed bill to control the practice of Bio-Analysts was successfully curtailed a year ago, but introduced this year and quickly passed by the State Legislature. The AIC, working through this Committee, and with representatives from other interested

groups, approached Gov. Rockefeller, and was instrumental in bringing about a veto of this bill. Legislation introduced in one state can easily be used as a model in other states, and therefore assumes much greater importance than at first realized. The Committee, therefore, is expanding by the appointment of one member from each Chapter to work with it, so that the Committee will be promptly alerted on legislation relative to chemists in any state where the AIC is represented.

The Committee on Library

The 1960-61 members of this Committee were:

Dr. Max Bender, *chairman*
Dr. Murray Berdick

The 1961-62 members are:

Dr. Max Bender, *chairman*; Amer-
ican Cyanamid Co., Bound Brook,
N. J.

Dr. Alfred E. Brown

Miss Juliette M. Moran

The AIC, through the courtesy of The Chemists' Club Library at 52 E. 41st St., New York 17, N. Y., is assembling there a collection of literature and legal documents having a bearing on the profession of chemistry. In particular, this Committee is now engaged in supplementing the collection with employment and patent assignment agreements in current use by large firms, so that information will be available for anyone desiring to study or compare current practice in these areas. Such material will be gratefully received by this Committee.

The Committee on Membership

During the past year, this Committee had as members:

Dr. L. T. Eby, *chairman*
Dr. Max Bender

During the current fiscal year, the membership committee consists of:

Fisher Gaffin, *chairman*; J. T. Baker
Chemical Co., 122 E. 42 St., New
York 17, N. Y.
Angus J. Shingler

Through the cooperation of the Committee on Public Relations, a brochure about AIC activities was prepared to supply information about the AIC to prospective members. The Chapters were stimulated to send in names of qualified persons interested in membership. These activities will continue.

The Committee on Qualifications

The members of this Committee in 1960-61 were:

Dr. L. T. Eby, *chairman*
Dr. Max Bender
Dr. E. J. Durham
Morris Kenigsberg
John Kotrady

The members for 1961-62 are:

Dr. L. T. Eby, *chairman*; 1105 De-
Witt Terrace, Linden, N. J.
Dr. E. J. Durham
Dr. John L. Hickson
Morris Kenigsberg
Dr. W. George Parks

This Committee passes on the qualifications of the applicants for AIC membership. A reorganization of procedure was made to shorten the time of report by the Qualifications Committee on proposed new

OUR COMMITTEES . . .

members. In all cases where the data are clear and sufficient, action may be taken by mail ballot.

The Committee on Education

In 1960-61, the chairman of this Committee was the late Karl M. Herstein. The members were:

Dr. E. J. Henley
Dr. C. G. Overberger
Dr. Lloyd H. Reverson
Gene A. Zerlaut

The present Committee is:

W. W. Benton, *chairman*; 2069 Watson Ave., St. Paul 16, Minn.
Dr. W. R. deMonsabert
Dr. Donald B. Keyes
Gene A. Zerlaut

Recently a study was made by questionnaire of the most useful courses for a student who wishes a background for a successful career in professional chemistry. The results were tabulated and reported in final form in the July issue of *THE CHEMIST*.

This Committee will study all phases and trends in the education of chemists and chemical engineers and report from time to time to the membership on its findings and recommendations.

The Committee on Employer-Employee Relations

During the past year this Committee had as members:

Dr. Lawrence Flett, *chairman*; New London, N. H.
O. B. J. Fraser
William Auchincloss

This Committee was reappointed with the following additional members:

Miss Hazel Bishop
Dr. Harold P. Dupuy
Paul E. Reichardt

The question of psychological screening tests incident to consideration for employment was studied by this Committee:

"The Committee feels that since these people of other disciplines are not used to assess a man's value as a chemist and since industrial chemistry requires, in most cases, abilities beyond those based on chemical or engineering knowledge, such a practice should not be objected to. It is, in fact, little different from subjecting the man to a medical examination. If the examination by psychologists or others were to be made subsequent to his employment, it would represent a reappraisal of the man and he should certainly be entitled to a discussion of the results and assurance that the results of the test would, in no way, interfere with his ambitions for his future with the company."

—*From Report to 38th Annual Meeting*

Some specific questions referred to the Committee were resolved quietly by mutual agreement between the parties involved.

The problem of re-employing older chemists becomes more critical, as the permissible retirement age moves lower. The man over 40 may already have served half or more of his professional career. He has often acquired specialized experience which warrants a high salary level, but which is applicable only in the position he has left. Needless to say, the man does not wish to start again from the bottom in a new field, but

neither does a new organization wish to start a man with a high income but with no special knowledge useful to them, when they can get a younger man more receptive to training, at a lower cost.

Some things can be done and have been done in individual cases to mitigate this problem, but we must face the physiological fact that mental as well as physical vigor and flexibility sooner or later will decline with age. To attack the problem on this fundamental plane by stimulating research on the aging process itself, seems the only possibility for a lasting solution to this urgent professional problem. When the effects of aging can be demonstrably controlled, the older chemist will be in a much stronger position professionally. (This phase of the subject is being studied by the new Committee on Health, described below.)

The Committee on New Chapters and Expansion

The members of this Committee who served in previous years were reappointed:

Martin B. Williams, chairman, 1013 Pratt Ave., N.E., Huntsville, Alabama.

Clark E. Throp, Eastern Vice-chairman, Beaver Falls, N. Y.

Dr. Rudolph Seiden, Midwestern Vice-chairman; Kansas City, Mo.

D. H. Killeffer, Southern Vice-chairman; Clearwater, Florida

Dr. Lloyd Van Doren, Western Vice-chairman, Tempe, Arizona

Robert E. Lacey, Secretary; Birmingham, Ala.

Dr. Morris J. Blish, Phoenix, Ariz.
Rev. Paul J. Casey, S.J., Scranton, Pa.

Dr. J. Edward Doody, F.S.C., Memphis, Tenn.

Arthur D. Etienne, Washington, D.C.
Dr. Lawrence Flett, New London, N. H.

Dr. Robert W. Freedman, Pittsburgh, Pa.

Edward L. Gutherlet, Seattle, Wash.

Dr. W. A. Hammond, Xenia, Ohio

James E. Henning, Madison, Wis.

Dr. Charles A. Horton, Oak Ridge, Tenn.

Paul H. Horton, Dallas, Texas

Dr. A. Edward A. Hudson, Jackson, Tenn.

Dr. Robert H. King, Dugway, Utah
Dr. Wilbur A. Lazier, Williamstown, Mass.

Charles R. Outterson, Richmond, Va.

Dr. L. F. Pierce, Tecate, Calif.

Karl A. Ratcliff, Des Moines, Iowa

Dr. Gus A. Ropp, Cleveland, Ohio

Dr. Robert D. Schwartz, Houston, Tex.

Henry G. Sellers, Jr., Pensacola, Fla.

Prof. R. Norris Shreve, Lafayette, Ind.

Dr. Samuel C. Spalding, Jr., Louisville, Ky.

James W. Stallings, Barnwell, S. C.

Dr. Frank J. Steele, Greenwich, Conn.

Dr. Sumner B. Twiss, Trenton, Mich.

Dr. Vanderveer Voorhees, Los Altos, Calif.

Dr. Terry C. Wallace, Sr., Los Alamos, New Mexico

Dr. J. A. Weybrew, Raleigh, N. C.

Dr. John W. Willard, Rapid City, So. Dak.

"Objective: Active participation of more members in the AIC program—through the formation of new chapters—for the mutual benefit of the individual and the organization.

"Achievements: During the past year, one chapter, the Golden Gate Chapter, has been established; two chapters, Connecticut Chapter and Virginia Chapter, have been converted from 'paper chapters' to truly active chapters; other previously established chapters are beginning their activities; and work toward the establishment of additional chapters has been started. The total number of chapters is now 28.

OUR COMMITTEES . . .

"Chapters in Existence Prior to October, 1958: 13—Alabama, Baltimore, Chicago, Louisiana, New England, New Jersey, New York, Niagara, Ohio, Philadelphia, Twin City, Washington and Western.

"Chapters Established During Period Oct. 1958 to May 1960: 14—Beaver Falls, Connecticut, Delaware, Florida, Michigan, Midwest, North Carolina, Northwest, Piedmont, Pittsburgh, Southwest, Tennessee, Virginia and Wisconsin."

—From Report to 38th Annual Meeting

It is apparent that this Committee has done effective work, and that it has established procedures worthy of retention.

The Committee on Public Relations

This Committee had as its membership during the preceding fiscal year:

Richard L. Moore, *chairman*

Dr. Max Bender

Merritt L. Kastens

Dr. Johan Bjorksten

Dr. Emmett B. Carmichael

This year the committee consists of:

Richard L. Moore, *chairman*; Public Relations Department, W. R. Grace & Co., 30 Hanover Sq., New York 4, N. Y.

Albert B. Allen

Mrs. Thelma C. Heatwold

James E. Henning

Merritt L. Kastens

Robert K. Neuman

During the past season, the Committee prepared a brochure about AIC Activities; designed a new cover and lay-out for THE CHEMIST; and assisted with press releases on the 38th Annual AIC Meeting. Among future activities, the Committee will advise the Chapters, if they need help in preparing news releases for local papers.

The Committee on Manpower

The previous membership of this Committee was:

Dr. E. J. Durham, *chairman*

Dr. Herman Bloch

Dr. A. W. Fisher, Jr.

O. B. J. Fraser

Dr. George L. Royer

The current Committee has as members:

Dr. Herman S. Bloch, *chairman*; 9700

N. Kedvale Ave., Skokie, Ill.

Dr. Walter S. Guthmann

Delbert Hanna

Harry J. Pappas

David W. Young

The Committee handled inquiries from the membership and prepared a statement for the 38th Annual Meeting concerning the military standby reserve situation. (THE CHEMIST, June 1961, p. 191).

The function of this Committee is to keep informed on matters affecting manpower; to bring to the AIC membership reports on pertinent matters; and to advise members, when requested, about manpower subjects.

The Committee on Constitution and By-laws

The Chairman and only member is Benjamin Sweedler, 420 Lexington Ave., New York 17, N. Y.

This Committee serves to keep the Constitution and By-laws in consonance with needs and practice, as they develop. It also passes on the Constitutions and By-laws of the local Chapters to see that they are consistent with the Constitution of the

National organization; and similarly reviews amendments made to local Chapter Constitutions.

At the present time a change in the by-laws of the national organization is contemplated to eliminate the classification of Associate membership. Present Associate members would become Members or Fellows, and it is possible that Membership requirements may be modified to require a shorter time of professional experience for the Member grade. It is believed that these changes will benefit the AIC.

The Committee on Student Medals

During the 1960-61 fiscal year, the committee had as members:

John Kotrady, *chairman*
Chester A. Amick
Dr. G. L. Cottle

The new Committee consists of:

Dr. Maurice J. Kelley, *chairman*; 515 Sheridan Road, Evanston, Ill.
Dr. Evelyn S. Slobodian

This committee is concerned with the rules and regulations that govern the annual award of Student Medals to college and university seniors. It also reads and passes on the essays that are prepared by student medalists who enter the Student Medalist Essay Contest.

The Committee on Ethics

The previous membership of this Committee was:

Dr. Sidney M. Cantor, *chairman*
Dr. Emil Ott
Dr. George L. Royer

The present membership is:

Dr. Sidney M. Cantor, *chairman*; 25 Rolling Road, Overbrook Hills, Philadelphia 31, Pa.
Dr. Emil Ott
Dr. Helmut Wakeham

AIC members subscribe to the Code of Ethics established by the AIC in its beginning—the first official standard of ethics in the field of chemistry. Infractions of the Code of Ethics, called to the attention of the Ethics Committee, have led to the admonition of members, and in one case to representations to a firm engaged in disapproved practices.

The Committee on Honorary Membership

In 1960-61, this Committee consisted of

Dr. W. George Parks, *chairman*
Dr. Walter S. Guthmann
Raymond Stevens
Dr. Lincoln T. Work
Dr. Lawrence Flett

This year, Dr. Peter R. Girardot, Jr., Pittsburgh Plate Glass Chemical Division, Barberton, Ohio, was appointed chairman with the request that he appoint other members consistent with the specification for the membership of the committee, as contained in the by-laws of the AIC.

In accordance with the regulations set up in the AIC Constitution and By-laws, this Committee recommends to the National Council the names of those it selects to receive Honorary AIC membership during the fiscal year. The Committee welcomes suggestions from the AIC Membership

OUR COMMITTEES . . .

of persons who are deserving of Honorary Membership. Each suggestion is carefully considered.

The Committee on AIC History

During the preceding years, this committee had as members:

Florence E. Wall, *chairman*
Dr. M. L. Crossley
Dr. Albert P. Sachs
Dr. John A. Steffens
Dr. Frederick W. Zons

The present committee consists of:

Florence E. Wall, *chairman*; 210 E.
68th St., New York 21, N. Y.
Maynard J. Pro
Albert P. Sachs

During preceding years, much of the early history of the AIC was assembled from the AIC records in the national office, in the archives of the first Chapters, and in printed accounts from magazines. Early anecdotes as they may be recalled by long-time members of the AIC are still welcome. The Committee will now continue on the actual writing of the history.

The Committee on Gold Medal Award

The membership of this Committee is specified in the AIC By-laws. This year the members are:

Dr. Emil Ott, *chairman*; 56 Green-
house Drive, Princeton, N. J.
Dr. Johan A. Bjorksten
Dr. Milton Harris
John Kotrady
Dr. W. E. Kuhn

The duties of this Committee are to select the Gold Medalist of the AIC for 1962. Here, as with the Committee on Honorary Membership,

suggestions from the AIC membership are welcome and will be carefully considered in making a choice of a suitable medalist.

The Committee on Nominations

The personnel of this Committee is specified by the AIC Constitution, and it consists of the National AIC President, President-elect, and Secretary, and the Chairmen of all the local Chapters. The Secretary asks each Committee member to nominate AIC Fellows for the positions of officers and councilors to be filled at the annual election. If the nominees accept their nominations, their names are all placed on a nomination ballot and sent to the AIC membership, which then selects the names that will appear on the election ballot.

The Executive Committee

This committee consists of the President, the President-elect, the Secretary, and the Treasurer. Its duties are to handle matters that may require immediate attention between Council meetings.

The Central Planning Committee

Last year this committee consisted of:

Dr. Max Tishler, *chairman*
Dr. Max Bender, *secretary*
Dr. J. A. Bjorksten
Dr. Milton Harris
Dr. W. E. Hanford
Dr. John H. Nair
Dr. C. G. Overberger
Dr. William J. Sparks

This year, the Committee members are:

- Dr. William J. Sparks, *chairman*, 704 Highland Ave., Westfield, N. J.
- Dr. Max Bender
- Dr. Emmett B. Carmichael
- Dr. W. E. Hanford
- Dr. Milton Harris
- Dr. Wayne E. Kuhn
- Dr. Clem O. Miller
- Dr. John H. Nair
- Dr. Pauline Newman
- Dr. C. G. Overberger

There are many assignments given to this Committee by the National Council. Whatever affects the future program of AIC activities, or what should be considered in planning a program for the future, is referred to this Committee. The place of future meetings is recommended by this committee. New ideas for activities are also generated here.

The Committee on Health

Appointed as Committee members to this new Committee are:

- Dr. Henry B. Hass
- Dr. Wayne E. Kuhn
- Miss Mildred Hunt
- O. B. J. Fraser
- Dr. Lloyd A. Hall
- Dr. Amos G. Horney
- Dr. W. George Parks
- Dr. Johan Bjorksten

The professional status and employment opportunities of older chemists have become an increasingly important problem, as average age increases and as the speed of technological advance tends to obsolete certain types of experience. In exploring this problem from all sides, the AIC cannot ignore the fact that physiological decline does take place in aging. The greatest single thing that can be done

to improve the competitive position of the average older chemist is to gain knowledge which will enable us to counteract the time-dependent decline in ability to perform. Biochemistry has now reached the point where this appears possible, but, as Roger Bacon wrote:

"In some things it is more hard to attempt than to achieve, which falleth out when the difficulty is not so much in the matter or subject, as it is in the crossness and indisposition of the mind to think of any such thing, to will or to resolve it."

While science has advanced to a point where success seems possible, there are no large funds available for this purpose. Out of the \$200,000,000. available for contract research at the National Institutes of Health, only 5.6% are ostensibly earmarked for aging, in spite of the fact that 90% of all deaths would not have occurred had the victim retained the resistance he had at age 20. Of these 5.6%, however, all but about .06% is devoted without apparent central direction to a helter skelter of miscellaneous projects which could not be expected to bring about a basic solution. As a result, aging has not participated in the rapid progress made in other fields; a person at 60 has only 2½ years better life expectancy now than he had in 1789.

The Committee will study what can be done to bring about a broadened realization of this state of affairs and its possible improvement. It will

OUR COMMITTEES . . .

also study the possibilities of allocation of funds for this research by military or space authorities, who in limited areas have an interest in the preservation of high physiological

performance for much longer periods of time than is possible now. On completion of this study, the Committee will make recommendations for action by the AIC.

Special AIC Announcements

Twin City Chapter Officers

The Twin City Chapter announces the following officers for the current fiscal year:

Chairman, Dr. John L. Wilson, 2101 Dudley Ave., St. Paul 8, Minn.

Vice-chairman, Dr. James T. Rehder, 555 Mt. Curve Blvd., St. Paul 16, Minn.

Treasurer, Dr. Kenneth E. Owens, 4010 Hidden Bay Road, St. Paul 9, Minn.

Secretary, Mrs. Virginia Carletta, 357 Hope St., St. Paul 6, Minn.

National Council Representative, Dr. John L. Rendall, 818 Summit Ave., St. Paul, Minn.

Social Hour in Chicago

A Social Hour for AIC members and their friends is scheduled to be held Monday, September 4, during the fall meeting of the American Chemical Society in Chicago, Ill. (See the program of the ACS meeting for the place and time.)

To All Chapter Secretaries

Please send to THE CHEMIST the dates of meetings scheduled or tentatively scheduled. These will be published under "Professional Appointments" for the information of AIC members, particularly for those who may be traveling in chapter areas at the time meetings are being held.

Philadelphia Chapter Elects Officers

The following officers for 1961-62 have been chosen by the Philadelphia Chapter:

Chairman, Dr. Claude K. Deischer, University of Pennsylvania, Philadelphia 4, Pa.

Chairman-elect, Dr. Justo Bravo, Sun Oil Company, Marcus Hook, Pa.
Secretary, Dr. Ezra H. Bitcover, U. S. Department of Agriculture, Philadelphia 18, Pa.

Treasurer, Elmer A. Weaver, U. S. Department of Agriculture, Philadelphia 18, Pa.

National Council Representative, Dr. Egbert M. Kipp, Sun Oil Company, Marcus Hook, Pa.

Chapter Advisor, Marcus Sittenfield, Consulting Chemical Engineer, Philadelphia, Pa.

To New Chapter Officers

A Manual for Chapter Officers and Councilors is available on request from The American Institute of Chemists, 60 E. 42nd Street, New York 17, N. Y.

The Instrument Society of America, Pittsburgh 19, Pa., will hold the 16th Annual Conference and Exhibit in Los Angeles, Calif., Sept. 11-15, 1961, at the Biltmore Hotel. The theme is "Reliable Information from Undersea to Outerspace."

Report from the Committee on Legislation

REPRESENTATIVE Victor L. Anfuso (D., N. Y.) has introduced a number of bills of interest to professional scientists and engineers. Briefly, those of particular interest are:

H.R. 5563: Would establish a special classification system within Civil Service Commission for professional engineering, physical science and mathematics positions. This schedule would be designated Professional Engineering-Scientific Schedule (PES). The purpose of the bill is to place the Government in a more favorable position than it now occupies as far as hiring and retaining of scientific and engineering personnel is concerned and to provide flexibility in utilizing such personnel.

H.R. 6348: Would provide a program to encourage greater conduct of basic research by Government contractors. Any research and development contract of \$50,000 or more would have added to it an additional 10% for carrying on of basic research by the contractor. Each such contract would contain a provision reserving to the Government a non-exclusive, royalty-free license for patents resulting from the work.

H.R. 6349: Would establish a Commission of nine persons to study all scientific, technological and engineering programs of departments and agencies of the U. S. Government. Its attention would be directed particularly to loss of efficiency resulting from duplication of efforts and methods by which better coordination might be achieved. The name of the group would be Commission on Coordination of Federal Scientific Activities. Three of its members would be chosen by the President, three by the Senate and three by the House and each would be a scientist or engineer. (*Committee note:* It must be kept in mind that the powers of such a Commission could easily be broadened to include research and development programs outside of the Government. Chemists and chemical engineers should be alert to the fact that "coordination" frequently expands into "control.")

Hearings have not been scheduled on any of these bills as yet, but the Committee on Legislation will keep the AIC membership informed on further developments. Also comments or inquiries on these bills may be directed to the AIC Committee on Legislation.

The 13th Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy, sponsored by the Analytical Chemistry Group of the Pittsburgh Section of the American Chemical Society and the Spectroscopy Society of Pittsburgh, will be

held at the Penn-Sheraton Hotel in Pittsburgh, Pa., March 5-9, 1962. The deadline for titles and abstracts of papers is Oct. 16, 1961. Contact Dr. C. F. Glick, (Program Chairman) U. S. Steel Corp., Monroeville, Pa.

The Impact of Federal Scientific Research Programs on Technological Progress

The Hon. Richard S. Morse

Assistant Secretary of the Army (R&D), Department of the Army, Washington, D.C.
(Presented, here slightly condensed, at the 38th Annual AIC Meeting,
May 12, 1961, in Washington, D.C.)

AS scientists you are aware of the changes occurring daily in commerce, industry defense and diplomacy, brought about by revolutionary scientific advances and an exploding technology. Our ability as a nation to compete in world markets, or on unforeseen battlefields, in the 1960's or '70's will be determined, to a great extent, by the scientific progress now underway in our country.

In the not too distant past, the primary objectives of our research efforts were a rising standard of living for mankind and a prolongation of human life. Today, in addition, the rising threats of aggression have forced us to broaden the objectives to include the security of the Free World and the exploration of outer space. Today Russia and the Free World are racing to advance technology with a concentration of resources usually reserved for wartime. Our ability to maintain an adequate lead in this technological race may mean our survival in years to come . . .

While we hold the lead in the technological race, we can no longer be complacent about a continued superiority. The Russian industrial base continues to expand at a rate more than double that of ours. The Soviet denial of consumer goods to their own people plus absolute control of the price structure permits a great portion of the Soviet Gross National Product to be used for furthering communism.

As technological progress has accelerated so has the emphasis on basic research. During World War II, we recognized that improved weapons, radar and the atomic bomb depended upon basic research conducted in the '30's and early '40's. If our technology is to continue to expand, great emphasis must be maintained on basic research. Sometimes I feel that we all agree on this in principle, but leave the implementation to the other fellow; especially since returns for our stockholders are seldom immediate. Basic research penetrates the expanding boundaries of science to provide the ever-growing requirements for improved technology. Without this, technology is limited to product improvement. Any business dependent only upon product improvement is doomed to be short-lived.

In the broad field of basic research, our government now pays directly or indirectly for more than 50% of all that is accomplished. So the impact

of federal scientific research programs on technological progress is more than significant. It is estimated that the Federal Government will obligate \$9.1 billion during fiscal year 1961 for the support of scientific research and development. This includes \$8.5 billion for the conduct of R & D and \$600 million for an increase in research facilities. About \$850 million of the \$8.5 billion or 10% of the funds for R & D is for basic research. This total of \$9.0 billion compares with obligations of an estimated \$8.6 billion for fiscal year 1960, and an estimated \$7.4 billion for fiscal year 1959. This year, three agencies—the Department of Defense, the Atomic Energy Commission, and the National Aeronautics & Space Administration—administer about \$7.6 billion, or 90% of the total obligations mentioned for the conduct of research.

The Army's contribution for basic research amounts to about \$50 million expended through more than 550 laboratories, universities and industries and 80 Army and other government installations. Part of this research is conducted in Japan and 14 countries in Europe. A large proportion of the research conducted by universities is that supported by federal funding. Without federal support, many of our universities could not make their present contributions to technology through basic research and by the provision of a large number of new scientists and engineers who enter industry better qualified than previously. A significant impact of the Federal Scientific Research Programs is to insure that we have provided in a great measure for a continuation in the expansion of technology.

Sometimes I find little appreciation for the degree to which military R & D—basic research and applied R & D—contributes to civilian techniques and products. Military R & D is concerned with the development of new knowledge, products, and techniques to meet military needs. Modern warfare is a vast complex of activities, most of which have civilian counterparts. So while the objectives of military and civilian R & D may differ, they frequently embody activities which are identical or similar. Through the years, many civilian products and techniques have been the direct result of military R & D programs. The earliest example which comes to mind concerns Eli Whitney.

In 1798, he became discouraged with problems related to the cotton gin, and accepted a contract to develop a system of manufacturing interchangeable parts for the production of firearms by the government arsenals. His success added to the continuing development of the industrial revolution, and we today accept mass production as fundamental. It is true that this contribution was inevitable, but the fact remains that it came sooner

THE IMPACT OF FEDERAL RESEARCH PROGRAMS . . .

because of a military need—and society benefited accordingly. Some other contributions of military R & D to civilian life are: Yellow-fever eradication, chlorination of water, nuclear power, blood-plasma substitutes, the modern aircraft, new high-temperature alloys, and the modern automobile automatic transmission system. Other contributions of military-sponsored R & D include: Better insecticides, flame-proof fabrics, heat-resistant and fire-retarding paints, helicopters, advanced weather-prediction techniques, tissue-bank techniques, miniature electronic components, silicon transistors, new metals, and automatic electronic computers.

Let us review some of the steps which led to the development of the automatic electronic computer. Early in World War II, the computations necessary to calculate trajectory and firing tables exceeded the work abilities of the Ballistic Research Laboratories of the U. S. Army. In 1942, the laboratories explored the possibilities of developing electronic computing devices to do the tasks. After preliminary study, a contract was let with the Moore School of Engineering of the University of Pennsylvania to develop an appropriate electronic computer. The first modern electronic computer was thereafter produced at a cost of about \$400,000. The importance of the computer in terms of sales figures is hard to measure, but it has contributed to increased productivity in many fields. Work once considered infeasible now has become commonplace. The original Army investment of \$400,000 has yielded dividends almost beyond imagination for the entire world.

In some cases, the transition from military to civilian application has been fairly direct. Civilian uses for synthetic rubber, developed out of military necessity in World War II, required little civilian effort. In other instances, military R & D provides only a few of the building blocks needed for a product that finds a place in the civilian market.

The entire civil aviation industry owes its present size to Defense funding. Our civilian airport system was developed before and during World War II to meet military requirements. After the war, these facilities, which are the backbone of the Civil Air Transportation network, were given to local communities. These communities could not have financed these large undertakings unassisted. Many of our existing airlines started with aircraft declared surplus to military needs. In addition, these planes would never have been developed in a similar period without military support. The Boeing 707, our first jet airliner, was a modified Air Force aerial refueling-cargo vehicle. Other commercial aircraft have been devel-

oped from military aircraft. And crews used on civil airlines are almost without exception Air Force-trained.

Most military occupations have their civilian counterparts, so that civilian economy and technology benefit directly from the transfer of skilled personnel who received their training in the Armed Forces. Our complex weapon systems require operating and maintenance skills which can be met only by training unskilled personnel in military schools. Upon completion of this training and minimum service required by law, many persons re-enter civilian life as experienced technicians.

You may be interested in some of the many items now in Army R & D which show promise for future application in some form for the civilian economy. Electronic parts have been reduced in size by modular concepts so that instead of 7000 parts per cubic foot, we can put 550,000 parts in the same space. Even this figure can be increased by the factor of 10 in some applications. The potential of solid circuit techniques is fantastic. So-called solid state devices, such as the ruby maser, the parametric amplifier, and the tunnel diode should have a great future in communications. In materials we are working in the fields of plastics, ceramics, cryogenics, pyrogenics and metallurgy . . . We feel that advanced metallurgy holds the key to many of our design problems. With the possibilities that the new alloys offer, many age-old problems may be solved.

Our dependence upon medical research is obvious. Our soldiers must be psychologically and physiologically prepared for combat in key parts of the world—the plains and mountains of Europe, the frozen wastes of the Arctic, the deserts of the Middle East, and the jungles of Africa and the Orient. Most of this research is also useful for civilian application. We are also continuing significant research in unusual power sources such as the nuclear reactor, the fuel cell thermionic converter and the magneto-hydrodynamic process.

The government has many agencies concerned with the space program. These include ARPA, DOD, NASA, FCC, and Commerce. The Army has the principal R & D effort in the development of communications satellite, and in my view the communications satellite offers for the entire world the most interesting space application for years to come. Satellites for military or civilian communications are almost indistinguishable in terms of R & D requirements and their design and operating characteristics. The NASA Rebound and Relay and the current Army ADVENT communication R & D programs are essentially in their early phases, but neither fully reflects a truly feasible active operation communications satel-

THE IMPACT OF FEDERAL RESEARCH PROGRAMS . . .

lite effort to fulfill needs for civilian use. As for the non-military communications, the use of world-wide communication satellites with wide band widths will have tremendous significance in terms of international relations and cooperation and can do much to establish the U. S. as a leader in space. If the R & D programs in communications satellites being done by the government were combined with an equal effort from industry, we could develop a system that permits person-to-person dialing throughout the world and world-wide TV facsimile programs. This is just one of the many projects under R & D by the government which has great commercial potential and must evolve rapidly, if we are to demonstrate the effectiveness of the free-enterprise system to the world.

I have given you but brief insight into "the impact of federal scientific research programs on technological progress," and particularly the contribution which the Army is making in these programs. We view these contributions to our defense effort with pride, realizing that they are equally as important for the peaceful benefit of mankind. Just recently a famous economist stated that "30 months from now, 14 cents of every dollar that you will spend for products manufactured by U. S. companies will be for things that are not being made today." I would add that half, or 7 cents of every dollar that you spend, will be for products which were developed from R & D sponsored by the government. It is important that we remember that in the fields of science and technology, we have significant advantages over the Communists. But we cannot rest on our laurels; we should strive to increase this advantage in the years to come.

The American Society for Testing Materials, Philadelphia 3, Pa., has elected Miles N. Clair of The Thompson & Lichtner Co., Inc., as president, and Alfred C. Webber of E. I. du Pont de Nemours & Co., Inc., as vice-president. R. Wade Senif of the B & O Railroad Co., continues as senior vice president. **Gordon M. Kline**, F.A.I.C., chief, Organic & Fibrous Materials Div., National Bureau of Standards, was elected a member of the board of directors.

The Celanese Corporation of America has moved to 522 Fifth Ave., New York, N. Y., from 180 Madison Ave., its headquarters for 32 years.

PHOENIX CHEMICAL LABORATORY, INC.

Fuel & Lubricant Technologists

Chemical Tests • Physical Tests

Qualification Tests

3953 Shakespeare Avenue
CHICAGO 47, ILL.

TRUESDAIL LABORATORIES, INC.

Chemists — Engineers — Bacteriologists

4201 North Figueroa St. | Bay Area Affiliation
Los Angeles 65 | Air Pollution Investigations
California 1300 Sansome St.
Capital 5-4148 | San Francisco, Calif.

Hawaiian Branch Office
Honolulu

Research & Development • Consultation
Analyses • Testing

Member: American Council of Independent Laboratories

Dr. Maurice J. Kelley, F.A.I.C., is now director of research laboratories of The Diversey Corporation, Chicago, Ill. Dr. Kelley, who received the 1959 Honor Scroll of the New York AIC Chapter, was formerly director of the Industrial Specialties Labs., of Nopco Chemical Co., Harrison, N. J.

Dr. Robert C. Swain, F.A.I.C., director general of Cyanamid International, a division of American Cyanamid Co., New York 20, N. Y., announces plans to construct a plant near Catania, Sicily, to produce broad-spectrum antibiotics by fermentation.

Charles P. Neidig, F.A.I.C., received the 1961 Memorial Award of the Chemical Market Research Association, at its annual meeting in New York in May. Mr. Neidig is a general partner of White, Weld & Co., investment bankers. He was formerly a chemical engineer. He now specializes in investment analysis for the chemical industry.

Dr. George B. Butler, F.A.I.C., professor of chemistry, University of Florida, was presented, May 2, 1961, with the Annual Research Award of the Florida Chapter of the Society of Sigma Xi. He was cited for his work in the discovery and establishment of the cyclic mechanism of polymerization of non-conjugated dienes.

Dr. F. W. Stavely, F.A.I.C., who directed the discovery of The Firestone Tire & Rubber Company's stereospecific synthetic rubbers, retired July 1, as director of research. He joined Firestone in 1922 and had been research director since 1945. He and Mrs. Stavely reside at 208 Overwood Road, Akron, Ohio.

Dr. Anthony M. Schwartz, F.A.I.C., assistant director of Harris Research Laboratories, Inc., Washington 11, D.C., received an Award of Merit for 1961 from the American Society for Testing Materials, in recognition of his work in the field of soaps and detergents.



SINCE 1870

LABORATORY SERVICES
for the
FOOD & DRUG INDUSTRIES

Drug Evaluation, Food Additive Studies,
Chemical and Biological Assays,
Clinical Studies, Research

LAWALL & HARRISON
Div. B 1921 Walnut St., Philadelphia 3 Pa 103-4327

Scientific Information -- Future Prospects

James W. Perry, Hon. AIC

Systems Engineering Department, College of Engineering
University of Arizona, Tucson

(Presented [here somewhat condensed] when the author received Honorary AIC Membership, April 22, 1961, at the University of Arizona, Tucson, Arizona).

WHO would have dared to predict, ten years ago, that sending an expedition to the moon would be, in 1961, a matter of widely-accepted national urgency? International competition has converted a "crazy idea" into a status symbol of world leadership. But important as such symbols may be, what they signify is more important—the ability to attain industrial advances; to meet international competition; to develop the new technology required by our own changing needs. Is there need to argue that raising the level of productivity of scientific research and technical development outranks even lunar expeditions in national urgency?

Fifteen years ago, it was clear that the productivity of research and development was being throttled by a bottleneck that had developed in making use of the rapidly increasing store of scientific and technical information *accumulating in libraries*⁽¹⁾ and as extensive files of reports, patents and documents. Duplication of previous work, especially redeveloping a process or product already patented by a competitor, is a glaring example of misguided research. But such duplication is only the visible part of the iceberg. More important in the lowering of research productivity is the failure to use publications and records to plan R & D so that a minimum of experimental effort provides a maximum of results.⁽²⁾ The application of previously recorded knowledge to evaluate interim results and to recast tentative plans for experimentation assumes increasing importance the larger the magnitude of the R & D assignment.

Such use of recorded knowledge implies that it is possible to select those items that are truly useful. This implies, in turn, that thought be devoted to asking questions when working in the library. That kind of thinking is similar to planning experiments in the laboratory. Furthermore, in using library information, its careful, even sceptical, evaluation is essential. Again there is a close parallel to careful evaluation of laboratory results. All of us are too likely to attach undue credence to the printed page. A mature, well-informed, active mind, capable of independent thought and evaluation, is essential to successful R & D whether working in the laboratory or the library.

But before the capabilities of the research mind can be applied to recorded information, the information must be found. The greater the

amount of recorded information, the more difficult it is to find the material of pertinent interest. Thus the library bottleneck gradually developed. By the mid-thirties, more time was required to locate the pertinent documents in the chemical library and related files than to peruse them. With the constant increase in the rates of scientific publication and of generation of unpublished reports, the situation becomes worse, even if, as is sometimes urged, no attention were paid to publications more than 5 or 10 years old—a questionable policy in many branches of chemistry. The use of library information in planning and conducting research would not have been possible in the '30's without abstract journals and their indexes, patent classification systems, card file indexes to report collections . . . There was a tendency to accept the abstracting, indexing and classifying methods of 25 years ago as "the best." But this counsel of ultra-conservatism could not provide a solution. Bold, positive thinking was required.⁽³⁾

During the past 15 years, it has been found possible to subdivide the task of selecting pertinent documents into two kinds of operations—those to be performed by automatic devices, especially electronic machines, and those to be performed by people. Philosophical questions of critical importance had to be resolved.⁽⁴⁾ Various devices and machines can be used to effect comparison between a set of subject matter characteristics that define the scope of an information requirement and sets of characteristics appropriate to the subject contents of various individual documents.⁽⁵⁾ Such characterization of the subject contents of documents can be performed, at reasonable cost, so as to provide ten times more meaningful code elements for accomplishing machine searching than entries are provided in the most detailed published subject indexes of chemical papers. Preliminary results confirm the expectation that electronic searching, in addition to high speed and low cost per search, recovers several times as much pertinent information as conventional index searching.⁽⁶⁾

Thus, the bottleneck has been broken so far as the development of methods is concerned. But before such methods can be applied to raise the productivity level of R & D, large masses of information must be processed. In this respect, library methods for facilitating the use of information differ from chemical plant production methods. A new chlorinator, once installed in the chemical plant, is ready to start producing. A new literature searching machine in the library is not ready to start productive searching until the material to be searched has been processed. This cannot be done in a few weeks or months . . . too much human effort is required. Yet the application of methods now available could eliminate the library

bottleneck, and double the productivity of scientific R & D.

Though predictions are risky, some questions may be asked: "What effect would doubling the productivity of scientific R & D on either side of the Iron Curtain have on the outcome of the Cold War?" "Is not the productivity of scientific R & D worthy of as much consideration as a lunar expedition?" "Does the experience of the past 15 years confirm or deny the following statement made in 1945: 'Publication has been extended far beyond our present ability to make real use of the record. The summation of human experience is being expanded at a prodigious rate and the means we use for threading through the consequent maze to the momentarily important item is the same as was used in the days of square-rigged ships.'?"⁽¹⁾ Today we have in prototype form the electronic means to surmount the limitations of methods that date back to the days of square-rigged ships. The operational application of these methods on a broad scale is essential to general effectiveness.

The foreseeable future will bring the widespread application of the resources of electronic technology to make recorded information accessible and effective. Machine literature searching methods will be refined, extended, analyzed as to operational parameters, and integrated with traditional indexing and classifying procedures.

Future Pioneering

Future pioneering possibilities are in much the same status as machine literature searching 15 years ago, or lunar expeditions 10 years ago—beautiful dreams or hare-brained nonsense depending on the point of view. To get a glimpse of future pioneering possibilities, the capabilities and limitations of recent machine literature searching methods may serve as a point of departure. These methods permit the subject contents of papers to be characterized in terms of (1) any set of specific terms, including those that may be introduced into the scientific vocabulary later, (2) a set of selected generic terms, e.g., "machine," "measure," "mechanical property," used for encoding the more specific terms, (3) a set of relationships between the selected generic terms and the more specific vocabulary terms and (4) certain syntactical or grammatical relationships among specific terms (and relevant generic terms) used to designate characteristics of the subject contents of documents and thus to generate encoded abstracts. An information requirement may be specified as a set of characteristics which is then compared, for selection, by automatic electronic devices, with the sets of characteristics that constitute the encoded abstracts.⁽⁷⁾

The range of possible questions is almost limitless. Any given question

may be interpreted broadly or narrowly so as to avoid "blanks" as search results. Equipment to conduct simultaneous searches has already been demonstrated.⁽⁸⁾ The ability to discriminate is thus teamed up with the ability to conduct searches whose scope may be varied by using generic terms.⁽⁹⁾ Such methods provide highly versatile selective capabilities as far as the direct recall of information from storage is concerned. There is also provided a measure of association, as may be suggested by "brass—alloy," "thermometer — measure" or "hardness — physical property." Machine searching may be set up so as to accomplish an extensive degree of correlation, especially by making use of relationships between specific terms and those of more generic character, though this differs from certain kinds of correlations of detailed information. For example, papers reporting different research work with the same chemical compound may not all report values or statements for the same set of properties. Enough may be known about a compound to permit its selective identification in terms of certain properties, but some are recorded in one paper, some in others, without the full set of properties being recorded in any one paper. It is a simple matter to extend machine literature searching methods to correlate automatically this kind of fragmentary information. Other types of automatic correlation are also possible.⁽¹⁰⁾

Another possibility relates to the fact that the basic tools in machine literature searching methods are concepts. The effectiveness of such methods depends on the precision of definition of the concepts and also their effectiveness as correlating means, distinct from precision of definition. This opens the possibility of redirecting the purpose of such extended methods and to use them to conduct studies of the usefulness of concepts for correlative purposes. The importance of such a development is evident when we recall that a principal feature of science progress is the development of concepts that enable us to correlate more readily the broader ranges of factual observations and thus to develop theories for making predictions. Thanks to the pioneering of Tanimoto, Russell and others, botany will likely be the first field to benefit extensively from electronic information processing capabilities in concept definition and development . . .⁽¹¹⁾

Philosophically, it is a relatively short step from the testing, defining and developing of concepts to doing the same with hypotheses and theories. Probably the methodology for applying electronic technology to developing theories and testing hypotheses will be radically different. It is doubtful if this more general purpose can be attained by recently developed selective-identifying methods. In addition to detecting the

SCIENTIFIC INFORMATION . . .

presence of sets of characteristics, it will be necessary to work out more versatile machine methods that will also take into account those relationships expressed by the hypotheses and theories undergoing test. It is likely that data processing by computers and machine literature searching methods, extended to include automatic correlation, will be linked up to provide powerful means for processing and correlating numerically expressed measurements and non-numerical observational material, such as cloud photographs made by weather satellites . . . New types of informational-logical machines will also be necessary.⁽¹⁴⁾ Gutenmacher & Vleduts

Developments will lead to capabilities and methodology that will stand in the same relationship to human thinking as the microscope or telescope stands to human seeing. The development of these intelligence amplifiers may have as profound an effect on science as the invention of the telescope had on astronomy. A great increase in our ability to test, define, develop, and replace concepts, hypotheses, and theories must bring a more widespread awareness of the importance of basic philosophical problems, such as the question of reality of a botanical species, or a chemical element, or the so-called ultimate particles of physics. These new developments may open up for philosophers broad fields for practical activity, as the invention of high-speed digital computers has opened up opportunities for mathematicians.

In converting these possibilities into actualities the key questions are: "How are we to define and to organize two sets of operations, those to be performed by various machines and those to be performed by people?" "How can these possibilities be presented so that they are realistically, imaginatively, appraised?" Emotional resistance to change requires careful attention, as emphasized in a recent Priestley Medal address.⁽¹²⁾ The scientific communication problem requires a complete reevaluation of purposes and procedures coupled with bold, imaginative thinking.⁽¹³⁾ From the historical point of view, there is also the further question, "Where, when, and by whom?"⁽¹⁴⁾

References

- (1) Bush, Vannevar, "As We May Think," *Atlantic Monthly*, **176**, 101-8, (July, 1945).
- (2) Flett, L. H., "Chemical Research," Chapter II in "Information Resources. A Challenge to American Science and Industry," edited by J. H. Shera, A. Kent and J. W. Perry, Interscience Publishers, New York, 1958.
- (3) For early summaries, see: Perry, J. W., "Information Analysis for Machine Searching," *American Documentation*, **1**, No. 3, 133-139, (1950); Perry, J. W. and Casey, Robert S., "Mechanized Searching," *Encyclopedia of Chemical Technology*, Vol. 8, pp. 449-467, Interscience Publishers, New York, 1952.
- (4) Perry, J. W., "The Characteristics of Recorded Knowledge," Chapter V in "Documentation in Action," edited by J. H. Shera, A. Kent and J. W. Perry, Reinhold Publishing Corp., New York, 1956.
- (5) For a general review, see: Bello, Francis, "How to Cope with Information," *Fortune*, **62**, No. 3, 162-7, 180, 182, 187, 189, 192 (1960). For books whose individual chapters present descriptions of information systems using various automatic and semi-automatic

devices, see: Casey, R. S. and Perry, J. W., editors, "Punched Cards. Their Applications to Science and Industry," Reinhold Publishing Corp., New York, 1951; Casey, R. S., Perry, J. W., Berry, M. M. and Kent, A. (editors) 2nd edition (1958); Peakes, G. L., Kent, A. and Perry, J. W. (editors) "Progress Report in Chemical Literature Retrieval," Interscience Publishers, New York, 1957; Shera, J. H., Kent, A. and Perry, J. W. (editors) "Information systems in Documentation," Interscience Publishers, New York, 1957.

(6) Hyslop, Marjorie R., "Machine Literature Searching—From Experiment to Experience," *American Documentation*, **12**, No. 1, 49-52 (1961).

(7) For details concerning the preparation of encoded abstracts and of their selective searching by specially designed automatic electronic equipment, see: Perry, J. W. and Kent, A., "Tools for Machine Literature Searching," Interscience Publishers, New York, 1958.

(8) See Chapter 18, Perry, J. W. and Kent, A., op. cit. *supra*.

(9) See Chapter 15, Perry, J. W. and Kent, A., op. cit. *supra*.

(10) See, for example, Chapter 14 in Perry, J. W., Berry, M. M. and Kent, A., "Machine Literature Searching," Interscience Publishers, New York, 1956.

(11) Rogers, D. J. and Tanimoto, T. T., "A Computer Program for Classifying Plants," *Science*, **132**, No. 3434, 1115-8, (1960); Russell, N. H., "Future Impact of Information Retrieval on Biology," Paper presented at the Symposium, "Computers for Processing Chemical Information," University of Arizona, 22 April, 1961.

(12) Hammett, L. P., "Choice and Chance in Scientific Communication," *Chemical & Engineering News*, **39**, No. 15, 94-7 (April 10, 1961); Stanerson, B. R., "Negative Serendipity," *Ibid*, **39**, No. 18, 70 (May 1, 1961).

(13) Perry, J. W., "Automated Scientific Communication Techniques of the Future," *Institute in Technical and Scientific Communications, 1960 Proceedings*, pp. 102-116, Colorado State University, Fort Collins, Colorado.

(14) Cf., for example, Dyson, G. M. and Riley, E. F., "Mechanical Storage and Retrieval of Organic Chemical Data," *Chemical & Engineering News*, **39**, No. 16, 72-5 (April 17, 1961), and Gutenmacher, L. I. and Vleduts, G. E., "The Prospects for the Utilization of Informational-Logical Machines in Chemistry (USSR)," *J. Assoc. Computing Machinery*, **8**, No. 2, 240-251 (1961).

Perry Honored at Information Retrieval Conference

THE presentation of Honorary AIC Membership to Prof. James W. Perry of the Systems Engineering Department, College of Engineering, The University of Arizona, Tucson, was made by Prof. W. George Parks, chairman of the AIC Committee on Honorary Membership, at the evening session of an all-day Symposium on "Computers in Research," held April 22, 1961, at the University of Arizona.

The morning session, sponsored by the AIC, featured "Computers for Processing Chemical Information." Speakers were Prof. Donald H. White, head of the Chemical Engineering Department at the University, on "The Status of Computers

in the Chemical Process Industries"; Marjorie R. Hyslop, manager, Documentation Service, American Society for Metals, on "The Professional Society's Contribution to Scientific and Technical Communication"; G. M. Dyson of *Chemical Abstracts* Service, on "Computer Produced Indexes and New Services at *Chemical Abstracts*"; and Prof. Norman H. Russell, head, Botany Department at Arizona State University, on "Future Impact of Information Retrieval on Biology and Chemistry."

In the afternoon, the subject was "Computers in Psychological Research, sponsored by the Arizona State Psychological Association. Speakers were Jack Rains of the Uni-

PERRY HONORED . . .

versity, on "Reaction Time to Onset and Cessation of Visual Stimuli"; Robert Weldon of Tucson, Arizona, on "The Simulation of Intellectual Processes"; R. W. Mitchell, of the University of California, La Jolla, on "The Service of Information Retrieval to the Psychologist," and a panel discussion on "Computers in Scientific Research," led by Prof. Perry. Participants in the discussion were Harold W. Coppock of Arizona State University; Curtis B. Merritt of the University of Arizona; Robert W. Mitchell, and Roger Weldon.

At the dinner session, Dr. Parks presented the Honorary Membership Certificate to Prof. Perry, and read a tribute from Dr. Lawrence Flett, former AIC president, who wrote in part:

"I had the opportunity to be associated with Perry in the formative years of his work when he sought and found better ways of retrieving information. There is probably no one in the world who has a better understanding of the information needs of the industrial research chemist and the existing means of satisfying those needs.

"Perry was among the first to recognize the impending tidal wave of recorded information and to make his voice heard, in the AIC and in other groups devoted to science. He gave up laboratory work, which he loved, as soon as Uncle Sam could spare him, and devoted himself to the information problem . . . he organized and directed groups now most active in the field.

"In the early days, like all pioneers, he was laughed at, but sneers and laughter never did anything more to

Perry than to make him work harder. Before success was achieved he had to become, in turn, an expert in mechanics and an expert in electronics.

"Thanks to Perry and his associates and co-workers, initial success has been achieved. While machine searching was inevitable, it is fair to say that it would not be here today without the indefatigable dedication of Prof. Perry . . . What has been accomplished is just a step, a dike to hold back the growing flood. What has been achieved he leaves in competent hands to perfect, while he goes on to greater understanding and a more durable solution to that now insurmountable problem of putting all the information we have to work."

Dr. Perry responded with an address on "Scientific Information — Future Prospects" (see this issue).

The citation on the Certificate of Honorary Membership reads:

James Whitney Perry

distinguished chemist, persevering author, and understanding educator, who has made basic contributions to the methods and successful mechanical means for the retrieval of information from the literature. The world has profited from his books and other publications, and is indebted to him for the achievements of groups which he has organized and directed.

ROBINETTE RESEARCH LABORATORIES, INC.

*Industrial Research • Consultation
Technical Surveys
Product Development
Textile, Ion Exchange Technology
Chemical Market Research*

Berwyn, Pa. Niagara 4-0601
Member, Amer. Council Ind. Labs, Inc.

FRIENDS DEPARTED

Dr. Harry Linn Fisher

Dr. Fisher, Hon. AIC, president of the AIC from 1940 to 1942, was born Jan. 19, 1885, at Kingston, N. Y., and died March 19, 1961, at Claremont, Calif. The AIC National Council adopted the following Resolution at its meeting held May 10, 1961:

Harry Linn Fisher; born into modest circumstances; educated at Williams College from which he received the bachelor's degree and later an honorary doctorate, and at Columbia University where he was awarded the degrees of Master of Arts and Doctor of Philosophy; teaching at Columbia, Cornell, and later the University of Southern California; serving as research chemist and as leader in chemical research with B. F. Goodrich Co., U. S. Rubber Co., Air Reduction Co., U. S. Industrial Chemicals Co., and later with Ocean Minerals, Inc.; serving government in the Office of the Rubber Director and with the Reconstruction Finance Corporation; serving the profession through the National Research Council, the International Congress of Pure and Applied Chemistry, and numerous societies, having been president of the American Chemical Society and of The American Institute of Chemists; having written for the scientific and professional literature and having been awarded 56 patents; being honored by his fellows with the Modern Pioneer Award of the National Association of Manufacturers and the Charles Goodyear Medal of the American Chemical Society; being a devoted father and a good citizen; has now after seventy-six years, completed his earthly journey and has left a record of achievement and of service as a treasured heritage to his associates, to his generation and to others yet to come,

Therefore, be it resolved that he Council of The American Institute of Chemists, records with regret the loss of our fellow member and friend, Harry Linn Fisher, and orders that a copy of this resolution be sent to his family and to his former associates.

Joseph Harrison Brennan

Mr. Brennan, F.A.I.C., was born May 5, 1902, at Minneapolis, Minn. He died April 19, 1961, at Niagara Falls, N. Y. He was a special student at the University of Minnesota, specializing in high temperature chemistry and metallurgy, a field to which he contributed a number of patents. In 1920 he began work as analytical chemist at the Electro Metallurgical Co., Niagara Falls, N. Y. After employment by U. C. & C. Research Labs., and Haynes Stellite Co., he returned to the Electro Metallurgical Co., a division of U. C. & C., in 1944. He was the 1950 Schoellkopf Medalist of the Western New York Section, ACS; chairman, Niagara Falls Section of the Electrochemical Society, 1951-52; was in charge of design and construction of the largest cobalt refinery in the U. S., and served as consultant to the Atomic Energy Commission on the hydro-metallurgy of uranium.

Carl Bussow

Mr. Bussow, F.A.I.C., was born March 11, 1899, in Union City, N. J. He died Jan. 17, 1961. He held the B.S. degree from both Cooper Union and Polytechnic Institute of Brooklyn, and also did graduate work at Polytechnic. He specialized in bituminous waterproofing, and protective coatings. From 1922 to 1961 he worked with A. W. Dow, Inc., New York, N. Y., having served as chemist, chief chemist, vice president and technical director. He was active on several committees of the American Society for Testing Materials. In 1954, he was honored by the Cooper Union Alumni Association "for outstanding achievements as consulting engineer and chemist in the field of bituminous materials."

Jerry H. Geller

Mr. Geller, F.A.I.C., was born Jan. 20, 1925. He died Jan. 12, 1961. He received the B.S. degree from Loyola College; the M.S. from the University of Pittsburgh. He held a Navy Research Fellowship at the University of Maryland (1948-1951); was chemist in charge of the Cambridge Branch Laboratory of the Maryland State Department of Health (1951-54); was research biochemist at the Dental Research Facility of the U. S.

FRIENDS DEPARTED

Naval Training Center (1955-58), and in 1958 became research biochemist, GS-11, for the U. S. Department of Agriculture, Philadelphia, Pa. He held a number of patents in the dental research field, and had received two Navy Awards for "superior accomplishment."

Dr. Ivor Griffith

Dr. Griffith, Emeritus AIC, was born Jan. 3, 1891, in Bangor, Wales, Great Britain. He died in Philadelphia, Pa., May 16, 1961. He received three degrees from the Philadelphia College of Pharmacy & Science. His early experience was with the laboratory of C. H. LaWall, with Stetson Hospital, and with the John B. Stetson Co., all of Philadelphia. He then joined the faculty of the Philadelphia College of Pharmacy & Science, where he advanced from instructor to professor, dean, and president. He was former president of the American Pharmaceutical Association, and editor of the *American Journal of Pharmacy* from 1921 to 1941, and of *Science Talk* from 1924-1941. He was much in demand as a speaker and he was the author of *To the Lilacs and Lobscuras*, books containing compilations of his articles, talks, and poetry. In 1930, Bucknell University bestowed on him the Honorary D.Sc. degree.

Karl M. Herstein

Mr. Herstein, Hon. AIC, was born Nov. 29, 1896, in Elizabethport, N. J. He died June 1, 1961, in New York, N. Y. He received the B.S. degree from Columbia University. Before establishing Herstein Laboratories, Inc., of New York, N. Y., in 1937, his experience included work with Sackett & Wilhelms Lithographing Corp., Hochstader Laboratories, and as vice president of Kenney-Herstein, Inc. During World War I, he held the rank of Second Lieutenant. He was long active in AIC affairs and had attended every Annual Meeting from 1925 until the latest one in May, when illness prevented him. In 1928 he prepared a comparative tabulation of engineering licensing laws of each state for the AIC Committee on Licensing. He served as Secretary-Treasurer of the New York Chapter; then as Representative from the New York Chapter to the National Council. He was chairman of the New York Chapter for two years. In 1955 he was elected councilor-at-large of the AIC. He had been chairman of the

Qualifications Committee for several years, and for 1960-61 was chairman of the Committee on Education. He served on the committee that aided in increasing the salaries of the chemists employed by the City of New York and the salaries of the chemists employed by the State of New York. In 1958, the New York AIC Chapter presented him with its Honor Scroll. On May 10, 1961, he was elected to Honorary AIC Membership in recognition of his devoted service and sustained interest in matters affecting the profession.

Dr. Maximilian P. Hofmann

Dr. Hofmann, F.A.I.C., was born July 18, 1892, in Berlin, Germany. He died Sept. 15, 1960, in Lakewood, Ohio. He received the doctorate from the University of Heidelberg. From 1915, in the U. S., he was employed by such companies as Hardite Metals, Inc., U. S. Colloid Mill Corp., Manton-Gaulin Mfg. Co., and C. O. Bartlett-Snow Co. He then joined the Empire Varnish Co., in Cleveland, Ohio. He specialized in colloid chemistry, emulsions and colloidal dispersants, and was the author of several articles and patents.

Joseph A. Kohm

Mr. Kohm, F.A.I.C., was born in Ithaca, N. Y., June 13, 1895. He died in New York, N. Y., Oct. 11, 1960. He held the B.S. degree from Cornell University. In World War I, he was in the Gas Defense section of the U. S. Army, after which he was employed by International Coal Products Corp., American Cyanamid Co., Travelers Insurance Co., the Bell Telephone Labs., the N. Y. City Department of Parks, New York University, the Work Projects Administration, and most recently, he was inspector of petroleum for the U. S. Army in Brooklyn, N. Y.

Arthur Linz

Mr. Linz, F.A.I.C., was born Dec. 21, 1895, in New York, N. Y., where he died March 30, 1961. He studied at Columbia University and at Zurich Polytechnic Institute from which he received the equivalent of the M.S. degree. His experience included work with Heller & Merz Co., Standard Aniline Products Co., Sherwin-Williams Co., Imperial Color Works, the Chemical Foundation, Ore & Chemical Corp., Gerado Collarin S.A., Standard Varnish Works, Climax Molybdenum Co.,

of which he was vice president, and finally, he became a consultant at 551 Fifth Ave., New York, N. Y. He had more than 100 patents issued to him. He modernized the milling operations of molybdenum production and the recovery of such by-products as tungsten and tin. He was the author of a number of publications.

Dr. Franz M. Neumeier

Dr. Neumeier, F.A.I.C., was born Sept. 4, 1903, in Frankfurt/Main, Germany. He died Feb. 15, 1961, in Bridgeport, Conn. He received the Ph.D. degree from the University of Berne, specializing in pharmaceutical chemistry. After coming to the U. S. in 1941, he was chemist for the International Vitamin Corp., and Keto Chemical Co., Inc., until 1943, when he joined McKesson & Robbins, Inc., as head of the research laboratories where he was employed at the time of his death.

Brig. Gen. Harry P. Newton

Gen. Newton, F.A.I.C., was born March 10, 1896, in Tredell, Texas. He died May 20, 1961, in DeBary, Florida. He received the B.A. and M.A. degrees from Baylor University, specializing in organic chemistry. In World War I he was a Second Lieutenant in the Coast Artillery. By 1936, he held the rank of Colonel. In World War II, he commanded the 3rd and 11th Anti-Aircraft Artillery Groups, and received the Croix de Guerre with Palms. He served as instructor at Baylor University and Georgetown College, worked for the Bureau of Chemistry & Soils, USDA, in Washington, D.C., and then became assistant director of the Southern Regional Research Labs., in New Orleans, La. After his retirement to DeBary, Fla., he was exceptionally active in civic affairs.

Dr. Robert E. Swain

Dr. Swain, Hon. AIC, was born Jan. 5, 1875, at Hollister, Calif. He died in Stanford, Calif., May 31, 1961. He held the B.S. degree from Stanford University; the M.S. and Ph.D. degrees from Yale. He had also attended Strassburg and Heidelberg Universities. In 1929, the College of the Pacific conferred the LLD degree on him. After joining the faculty of Stanford University, he rose from in-

structor to professor, executive department head and acting president. He was made emeritus in 1940. In addition to many advisory activities, he was a member of the U. S. delegation to the International Union of Pure and Applied Science for many years, and was its vice president from 1938 to 1947.

Dr. William D. Turner

Dr. Turner, F.A.I.C., was born Sept. 25, 1889, in Sioux City, Iowa. He died in New York, N. Y., Feb. 24, 1961. He received the B.S. and Ph.D. degrees from the University of Chicago. He was professor and head of the Department of Chemistry and Chemical Engineering at the University of Missouri, School of Mines and Metallurgy, from 1917 to 1928, and then became assistant professor of chemical engineering at Columbia University. He resigned from Columbia to engage in engineering consultation, and then became technical director of Airkem, Inc., New York 17, N. Y.

NOW OVER 5100 BIOS CHEMICALS

- 1,8-DINITRONAPHTHALENE
- 1,6-DINITRO-2-NAPHTHOL
- 2,6-DINITROPHENOL
- β -DIOLEIN
- 4,4-DIPHENYLBIPHENYL
- DIPHENYLCARBAMYL CHLORIDE
- DIPHENYLDICHLOROSILANE
- DIPHENYLGLYCINE
- DIPHENYLHEXATRIENE
- DIPHENYLHYDROXYLAMINE
- DIPHENYLINE
- 4,4-DIPPERIDYL
- 2,2-DIQUINOLYL
- β -DISTEARIN
- DITHIODIGLYCOL

Ask for our new
complete catalogue.

BIOS
Laboratories, Inc.
17 West 60th St. New York 23, N.Y.
Plaza 7-8171

New AIC Members

We cordially welcome the following new AIC members, elected at the May 10 and June 5, 1961, meetings of the National Council:

FELLOWS

Arveson, Maurice H.

815 Argyle Ave., Flossmoore, Ill.

Boley, Alan E.

Production Manager, Interstate Chemical Co., 1228 W. 12 St., Kansas City, Mo.

Boonstra, Dr. Bram B.

Section Head, Rubber & Plastics Lab., Cabot Corp., Cambridge, Mass.

Brownley, Dr. Floyd L., Jr.

Professor and Head, Department of Chemistry & Geology, Clemson College, Clemson, S. C.

Cameron, Jack W.

Chief Engineer, Vitagen Corp., Pasadena, Calif.

Derr, Dr. Paul F.

Technical Assistant to Director, Food Machinery & Chemical Corp., Princeton, N. J.

Deszyck, Dr. Edward J.

Senior Research Scientist, Philip Morris, Inc., P.O. Box 3D, Richmond 6, Va.

Duke, Dr. Joseph A., S. J.

Chairman, Department of Chemistry, Director, Div. of Science, Wheeling College, Wheeling, W. Va.

Fazio, Thomas

Research Chemist, American Machine & Foundry Co., Chemical R & D Div., Springdale, Conn.

Gillingham, James M.

Director, Pharmaceutical Product Dev., Diamond Labs., Des Moines, Iowa

Granberry, Edwin P., Jr.

Engineer, The Martin Co., Orlando, Florida

Hand, H. William

10911 Abbotford Road, Whittier, Calif.

Heatwole, Mrs. Thelma C.

Patent Liaison Officer, Philip Morris Research Center, Richmond 6, Va.

Hobbs, Dr. Robert B.

Chief, Paper Section, National Bureau of Standards, Washington 25, D.C.

Holmes, Donald C.

Staff Assistant, Office of Science, ODDR & E., OSD, Washington, D.C.

Hughes, James P.

Assistant to the Director, Southern Utilization R & D Div., ARS, USDA, New Orleans, La.

Jacobson, Mrs. Maria B.

Senior Literature Searcher, American Machine & Foundry Co., Springdale, Conn.

Kapp, Dr. Mary E.

Chairman, School of Applied Science, Richmond Professional Institute of William & Mary College, Richmond 20, Va.

Kincheloe, Glenn W.

Associate Chemist, Nalco Chemical Corp., Chicago 38, Illinois

Klioze, Dr. Oscar

Director, Product Dev. & Quality Control, A. H. Robins Co., Inc., Richmond, Va.

Lea, Dr. David C.

Director, R & D, Ecusta Paper Div., Olin Mathieson Chemical Corp., Pisgah Forest, N. C.

Lauer, Dr. Karl H.

Professor of Chemistry, University of Alabama, Tuscaloosa, Ala.

Long, John T., Jr.

President, Arizona Research Consultants, Inc., 917 W. Hatcher Rd., Phoenix, Ariz.

McCaughay, Dr. William F.

Associate Professor, Biochemistry & Nutrition, University of Arizona, Tucson, Ariz.

Olson, Dr. George G.

Research Director, Arizona Research Consultants, Inc., Phoenix 21, Ariz.

Oriani, Dr. Richard

Assistant Director, U. S. Steel Corp., Laboratory for Fundamental Research, Monroeville, Pa.

Pedersen, Peder M.

Research Associate, American Tobacco Co., Richmond, Va.

Phelps, Arthur L.

Chairman, Dept. of Chemistry, Phoenix College, Phoenix, Arizona

Pietrowicz, Ambrose L.

Owner, Consultant, Scientific Control Labs. of Calif., Los Angeles 1, Calif.

Ryan, Ed. M.

Owner, Ed. M. Ryan & Co., P.O. Box 3497, Phoenix, Arizona

Scott, Dr. Robert C.

Vice President Manufacture, Chemagro Corp., Kansas City 20, Mo.

Slover, Archy F.

General Manager, Western Operations, Chemical Specialties Div., Pennsalt Chemicals Corp., Los Angeles 22, Calif.

Sullivan, Dr. Thomas E.

Director of Natural Sciences and Mathematics; Head, Chemistry Dept., Rockhurst College, Kansas City, Mo.

Tasker, Dr. Clinton W.

Director, Technical R & D, Packaging Corp. of America, Grand Rapids, Mich.

Totten, A. Irving, Jr.

General Director, Packaging Research Div., Reynolds Metals Co., Richmond, Va.

Weilmuenster, Dr. Earl A.

Assistant Manager, Propellant Dev. branch, United Technology Corp., P.O. Box 358, Sunnyvale, Calif.

Wheeler, Rev. James D., S.J.

Assistant Professor of Chemistry, Rockhurst College, Kansas City, Mo.

REINSTATED TO FELLOW**Dunn, Dr. Max S.**

Professor of Chemistry, University of California, Los Angeles 24, Calif.

**RAISED FROM MEMBER
TO FELLOW****Scheer, Walter E.**

Consultant, 50 E. 41st St., New York 17, N. Y.

MEMBERS**Ahend, Dr. Phillip G.**

Research Chemist in Organic Synthesis, Armour & Co., Chicago, Ill.

Coleman, Walter L., III

President & Technical Director, Coleman & Flynn Chemical Products Co., 7905 South Rhodes, Chicago, Ill.

Domijan, John

Teacher of Chemistry, Amity Regional High School, Woodbridge, Conn.

Gaudelli, Robert L.

Junior Perfumer, Norda Essential Oil & Chemical Co., New York 1, N. Y.

Germino, Felix J.

Associate Chemist, American Machine & Foundry Co., Springdale, Conn.

Infantino, Joseph R.

Associate Research Chemist, Coatings & Plastics, American Machine & Foundry Co., Springdale, Conn.

Lloyd, William H.

Project Chemist, Eitel-McCullough, Inc., 301 Industrial Way, San Carlos, Calif.

Louis, George A.

Project Engineer, U. S. Semiconductor Products, 3540 W. Osborn Rd., Phoenix, Arizona

Vecchia, Ugo Joseph

Perfumer, Norda Essential Oil Co., 601 W. 26th St., New York 1, N. Y.

**RAISED FROM ASSOCIATE
TO MEMBER****Tamorra, Dr. C. Richard**

Chemist, Pharmaceutical Product Development Section, Lederle Laboratories, Pearl River, N. Y.

ASSOCIATES**Barash, Irvin**

332 Roseberry St., Philadelphia 48, Pa.

Carmellini, Andrew E.

Associate Research Chemist, American Machine & Foundry Co., Springdale, Conn.

de Mauriac, Richard A.

5021 Fairway Road, Drexel Hill, Pa.

DybdaHL, Harlan E.

Research Chemist, The Toni Company, St. Paul 1, Minn.

Houston, Edward L.

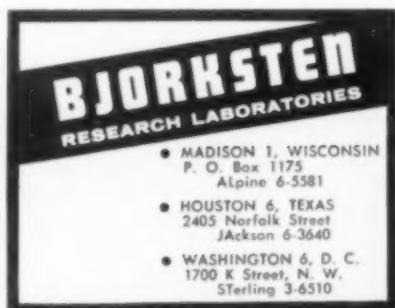
Salesman, Will Corporation of Georgia, 890 New Chattahoochee Ave., N.W., Atlanta, Ga.

Malone, Edith

2541-18th St., Ensley, Birmingham 8, Alabama

Sheedy, Joseph D., Jr.

Chemical Engineer, Litton Industries, San Francisco, Calif.



Communications

Additional Reference Suggested

To the Editor:

May I congratulate THE CHEMIST and its editor for the article by Dr. Claude H. Hills in the May CHEMIST, page 157. My only criticism is the omission of Andrew D. White's "A History of the Warfare of Science with Theology in Christendom" from Dr. Hills' list of references. This was published in 1895 but has recently been reprinted by Dover and George Braziller. It is still the best in its field, in my opinion.

—John W. McBurney, F.A.I.C.
Silver Spring, Maryland

On Incentives

To the Editor:

In reply to Dr. Bjorksten's letter, "The Incentive to Produce," (March 1961 CHEMIST, p. 101), I gather that a union of the Armed Services with the corporations serving them is the best way to promote the general welfare. The purpose of the patent system, the corporation system and the Armed Services is surely for the promotion of the general welfare in this nation of "government for the people."

How then does Dr. Bjorksten explain that the No Patent System of Russia produced the first sputnik, the first moon shot (the corporation system has yet to accomplish this), the first photographs of the far side of the moon (another feat yet to be

attempted by the corporation system), the first probing of the atmosphere of Venus, etc.

Surely Russia cannot be accused of stealing space secrets from the U. S. In fact some of our scientists with the aid of U-2 knowledge would like to know how a No Patent system can do this. Especially in view of the backward state of Russia and its peasants at World War I and the extreme devastation of over 50% of its industrial capacity in World War II.

It is believed that a scientist should look at facts as they are and not be induced by mental conditioning to accept wishful thinking. "Calling a cow a horse doesn't make it one" (Abe Lincoln).

—Dr. Frank Makara
New York, N. Y.

Reply to the Letter Above

To the Editor:

In reply to Dr. Frank Makara's letter stressing the first sputnik, the first moon shot, etc., as evidence of superior performance of a no-patent system, surely Dr. Makara as a patent attorney knows that these things would have been unpatentable in the U. S. as well. The difference between the sputnik, the moon shot, etc., and the prior art of Goddard and Valier and even some early Chinese art is clearly one of degree and not of kind, and thus noninventive. Even if a couple of single examples were statistically significant and persuasive,

which they are not, these particular examples would be beside the point because they would have been unpatentable in the United States' system as well.

So long as human nature is what it is, performance will be stimulated by reward, particularly if this reward is connected to the specific performance as it is in our patent system.

—Dr. Johan Bjorksten, F.A.I.C.
Madison, Wisconsin

Wanted: Gasoline Storage Bags

To the Editor:

I would like to obtain rubber, plastic or neoprene bags that are capable of carrying and storing an oil-gasoline mix safely and without deterioration of the bag. Such bags should hold 3 to 5 gallons of gasoline. They could be used aboard small boats with outboard motors on extended cruises, to hold an extra supply of gasoline for the motor. When the bag is emptied it could be easily stored away.

—R. Thornton
32 Holman Road
Auburndale 66, Mass.

Before and After E = Mc²
Of two Laws of Conservation
In the Chemist's conversation
That of Matter seemed by far
the best,
But now the transformation
Is a mighty indication
That Physics is of value in his quest.
—Dr. J. P. Montgomery, Hon. AIC
Tuscaloosa, Ala.

Opportunities

Doris Eager, M.A.I.C.

Positions Available

Chemist, female. Some experience in chemical analysis desirable, but will consider June graduate. *Good Housekeeping Magazine*. Take typed resume. Personnel Office, Hearst Magazine, 309 West 56th St., N. Y. 19, N. Y.

Senior Research chemist, synthesis of new monomers, functional compounds, other organics. Ph.D., with 2-6 years' experience in chemical research. Salary commensurate with experience and ability, plus excellent fringe benefits. Company is world-wide petro-chemical organization headquartered in eastern U. S. Box 81, THE CHEMIST.

Chemists Available

Chemist, F.A.I.C. Experienced in textiles, dyes, resins, polymers, coatings. Desires part-time, per diem on special projects. Resume supplied upon request. Box 82, THE CHEMIST.

Versatile Chemist, M.A.I.C., A.B., plus graduate work. Ten years experience, diversified—foods, natural flavors, natural products, vitamins, low-calorie foods. Proven supervisor and production manager. N. Y., N. J. or New England preferred. Salary open. Box 86, THE CHEMIST

The boards of directors of John Wiley & Sons and Interscience Publishers have decided, subject to approval of their stockholders, to merge the two publishing houses under the name of John Wiley & Sons, Inc.

THE LENTO PRESS, INC.

Distinctive Printing

441 Pearl Street New York, N.Y.
WOrth 2-5977

The Salaries of Chemists in Australia, 1960

The table below shows the relationship between age, function, and remuneration for members of the Royal Australian Chemical Institute who are employed in industry. For groups where the numbers of replies received were insufficient for the calculation of reliable median salaries no figures are shown. The salary is shown in pounds per annum. (As of June 13, 1961, the Australian pound was the equivalent of \$2.2325 in U. S. money.)

(The table below is reprinted from the Appendix to the Report of the Emoluments Committee, from *Proceedings of the Royal Australian Chemical Institute*, Dec. 1960, page 498.)

**Age—Function—Remuneration
(male employees in industry)**
Median Salary, Pounds p.a.

Age (years)	Adminis- tration	Analysis & Testing	Develop- ment	Produc- tion	Research	T.S. & A.
26-30	2000	1717	1788	1763	1913	1750
31-35	2230	1731	2146	2057	2097	1938
36-40	2805	1850	2229	2271	2063-*	2125
41-45	3187	1934	2250	2222	2313	2344
46-50	3462	1833	2667	2583	—	—
51-55	4444	1575	—	2375	—	—
56-60	3893	—	—	—	—	—
61-65	3813	—	—	—	—	—

SEND
FOR **Free Data**
ON RESEARCH

- Analytical Services
- Product Evaluation
- Bacteriology & Toxicology
- Food Technology

Foster D. Snell, inc.
CONSULTING CHEMISTS • CHEMICAL ENGINEERS
29 West 15th Street
New York 11, New York
WATKINS 4-8800
Direct Dialing Area 212

Baltimore, Md.
Bainbridge, N.Y.

MEMBER AMERICAN SOCIETY OF INDEPENDENT LABORATORIES

Dr. Emmett B. Carmichael,
F.A.I.C., assistant dean, Medical College of Alabama, The University of Alabama, Birmingham, has been appointed chairman of the Advisory Committee to the Alabama Hall of Fame Board, in the classification: Scientists, for 1961.

Dr. Donald E. Hudgin, F.A.-I.C., has been appointed associate director of research for polymers in the Research Department of Diamond Alkali Co., Cleveland 14, Ohio.



Arthur D. Little, Inc.

ADL offers experience and capability in:

- Corporate Planning and Organization
- Advanced Research and Engineering
- Product Research and Development
- Production Engineering
- Market Analysis and Sales Planning

ADL scientists and engineers work closely with client organizations in performing assigned work through any desired stage of development.

Consultants to Industry

SINCE 1886

Cambridge • New York • Chicago • Washington
San Francisco • San Juan • Edinburgh

Chemical Books Abroad

BY DR. RUDOLPH SEIDEN, F.A.I.C.

Wiba Verlag, Muenchen: *Woerterbuch der Patentfachsprache*, by B. Klaften and F. Allison; 2nd ed., 568 pp.; DM 68.—This dictionary facilitates reading and translating German and English patent literature with its often so difficult legal terms. It has a supplement of technical terms relating to patent drawings.

Ferdinand Enke Verlag, Stuttgart: *Die Flammenspektralanalyse*, by W. Schuhknecht; 1961, 270 pp., 42 ill., 67 tables; DM 69.—Deals with the scientific foundation and latest working methods of flame photometry and flame spectrography.

Brandstetter Verlag, Wiesbaden: *Woerterbuch der industriellen Technik*, by R. Ernst—*Vol. I, German-English* (5th ed., 807 pp.; DM 29.80), *Vol. II, English-German* (10th ed., 671 pp. and 121 pp. supplement; DM 28.)—A most useful, dependable dictionary of industrial techniques, including related fields of science and engineering, translating and briefly defining over 75,000 German and over 50,000 English keywords. • *Woerterbuch der Chemie*, by R. Ernst, *Vol. I, German-*

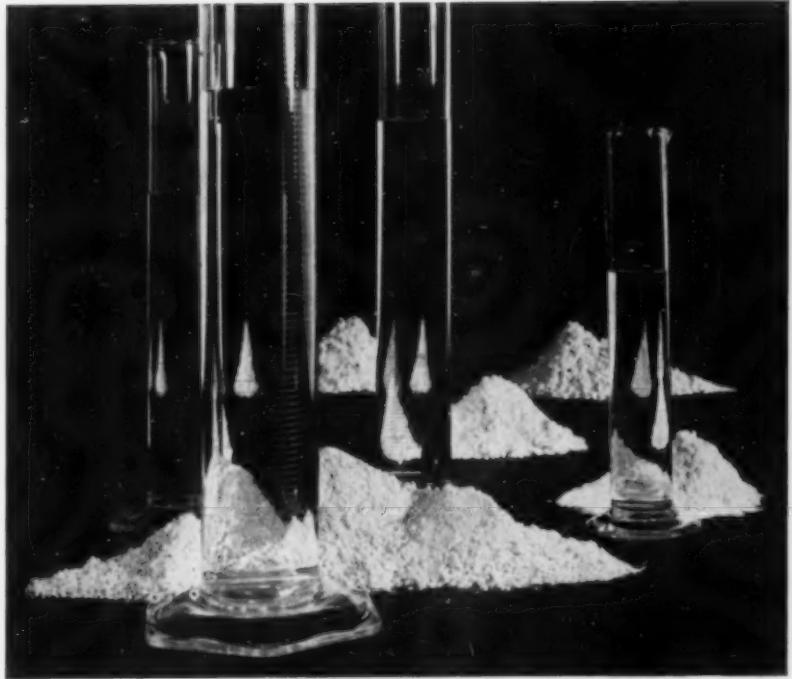
English; 1961, 727 pp.—Chemists following German literature will be glad to know that this newest chemical dictionary is reliable; it includes over 45,000 well selected German terms—scientific, technological, and commercial.

Volk und Wissen, Berlin: *Fachrechnen*, by K.-H. Hoppe et al.; 4th ed., 303 pp., 54 ill.; DM 8.—A textbook of simple calculations performed daily in industry and school laboratories. • *Laborkunde, Vol. I*, by S. Otto et al.; 1955, 268 pp., 368 ill.; DM 6.60.—A laboratory text of basic procedures and equipment used in chemical laboratory practice. • *Chemische Versuche im Unterricht, Vol. II* (metals), by H. Stäpf 3rd ed., 227 pp., 69 ill.; DM 4.50) and *Vol. III* (organic chemistry), by H. Thomassen et al. (1955, 252 pp., 32 ill.; DM 7.10)—Contain descriptions and explanations of hundreds of experiments easily performed by high school and college students.

Dr. Robert Heggie, F.A.I.C., of American Chicle Company, Long Island City, N. Y., has been elected honorary comptroller of the American Section of the Society of Chemical Industry. **Dr. Samuel Lenher**, F.A.I.C., **Dr. W. H. Lycan**, F.A.I.C., **Dr. Glenn A. Nesty**, F.A.I.C., **Dr. C. F. Rassweiler**, F.A.I.C., and **Dr. Robert C. Swain**, F.A.I.C., were among those elected to the Executive Committee of the Section.

Dr. Kenneth S. Pitzer, F.A.I.C., is now president of Rice University, Houston, Texas. He is also chairman of the General Advisory Committee to the Atomic Energy Commission.

Dr. Robert N. DuPuis, F.A.I.C., vice president—research, General Foods, White Plains, N. Y., announces the appointment of W. M. Tucker as new products coordinator.

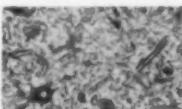


The right grade for every degree of clarity with Celite Filtration

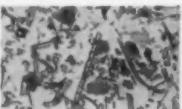
For any filtration problem, there's a Celite® filter aid grade that gives you the exact degree of clarity desired at the fastest flow rate obtainable. Celite is available in many different grades, including special grades for specific applications. No other supplier gives you so wide a choice.

Celite's lower wet density means greater surface coverage, and its higher uniformity provides more consistent results from month to month, carload to carload, year after year.

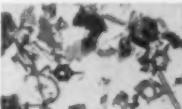
For full details on how Celite gives the fastest, most efficient filtration at the lowest possible cost write: Johns-Manville, Box 14, New York 16, N. Y. In Canada: Port Credit, Ontario. Cable: Johnmanvil.



Filter-Cel®



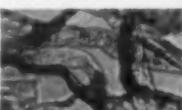
Hyflo®



Celite 545



Perlite



Fibra-Flo® 752
(asbestos and cellulose)



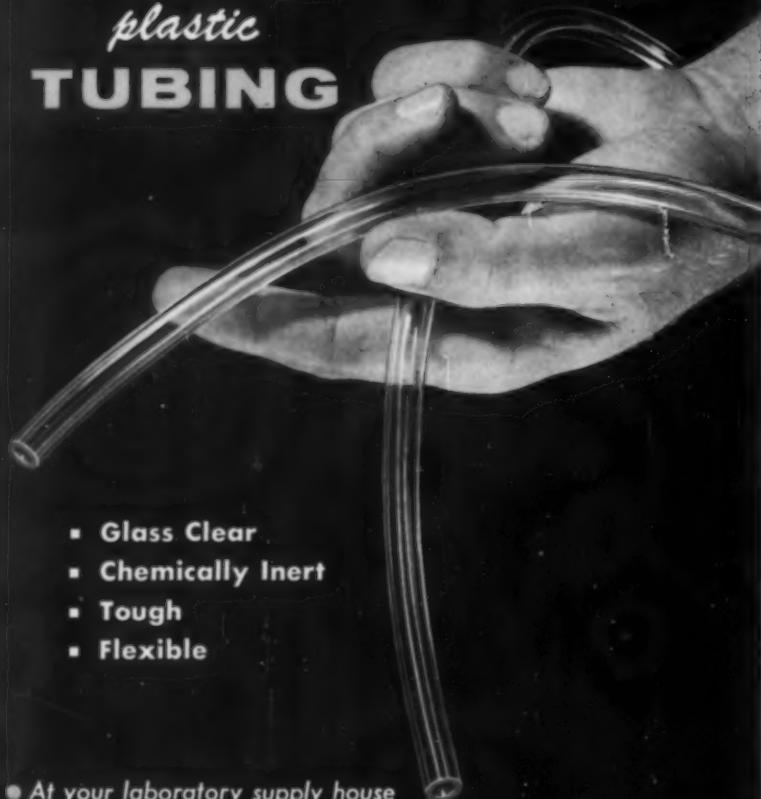
Fibra-Flo® 750
(asbestos)



These photomicrographs show the range of characteristics of Celite filter aids.

JOHNS-MANVILLE

TYGON
plastic
TUBING



- Glass Clear
- Chemically Inert
- Tough
- Flexible

• At your laboratory supply house

PLASTICS & SYNTHETICS DIVISION



U. S. STONEWARE
AKRON 9, OHIO

